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Why the Manchurian Plague Did Not Cross the Yallu River in the Early 20th Century

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I. Introduction

When I, Hyunsook Lee was in San Juan of Puero Rico from 1997 to 1999, I used to chat with my neighbors outside the porch. I was the only one bitten by mosquitoes, and my next door neighbors, who were Spanish descendents, didn't get bitten at all. It seemed that the Puertorican mosquitoes knew my origin. I knew that they were getting bitten by mosquitoes like me, since I received school newsletters warning about yellow fever and dengue fever diseases. However, it seemed to be true that the Puertorican mosquitoes preferred the Korean newcomer's blood rather than Puertoricans'. It was an enigma for me how Puertoricans could avoid mosquito bites, while Koreans were getting so many bites under the same circumstances.

As someone keenly interested in governmental public health policy measures, we have come to realize that the outbreaks of SARS and the novel flu served as a catalyst for the advancement of preventive measures against epidemics in Korea in the 21st century.

In 2003, when SARS (Severe Acute Respiratory Syndrome) was running rampant in China [including Hong Kong and Taiwan] with seven thousand cases including 36 casualties being reported to the World Health Organization (WHO), Korea reported only three cases without any deaths.[1)]

On the other hand, during the recent outbreak of novel influenza, which resulted in 184,497 people dying in 214 countries from September 2009 to August 1, 2010, some 263 people were reported dead in Korea (Park and Cho, 2009:4). This unprecedentedly high number of victims from a single disease in such a short epidemic outbreak inevitably stirred up social panic, but it provided impetus for better Korean government policies against epidemics and advanced awareness of proper hygienic measures. In particular, emphasis was placed on wearing masks and hand washing. At the time, every school class room was supplied with a cleaning device to wash one's hands, and we recall having to wash our hands multiple times daily not only at home but also at school.

The drastic difference in the respective infection rates of SARS and novel flu within Korea has raised the question of why one epidemic did not result in any deaths and another caused so many casualties. One reason cited for the larger outbreak of the novel flu has been the Korean Government's failure to initiate appropriate initial countermeasures (Park and Cho, 2009); however the government measures for the earlier SARS outbreak were not any superior. The unproven rumor that the lactobacillus and allicin-rich Korean kimchi helped to fight the spread of SARS began to spread widely and eating Korean kimchi be-

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1) WHO's Summary of probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003(http://www.who.int/csr/sars/country/table2004_04_21/en).

came the rage in China and Japan.[2)]

The question remains, why did SARS, rampant in neighboring China, remain virtually unseen in Korea while novel flu, brought by Korean travelers who had been to Mexico, was much more widespread? This led me to research similar cases of drastically different outcomes of two pandemic diseases, only to find such an instance in the early 20th century, when the pneumonic plague and cholera broke out in Manchuria. The pneumonic plague did not break out in Korea while cholera was prevalent in the early 20th century during the Japanese annexation period despite modern preventive measures against epidemics. Pneumonic plague, which is transmitted by air as opposed to bubonic plague transmitted via rats, is known for its strong contagiousness. In the early 20th century the rampant outbreak in Manchuria and Japan claimed the lives of thousands, whereas in Korea virtually no one was infected. How can this be explained? Looking at the areas in which the pneumonic plague broke out in Manchuria, one can see that it would have been virtually impossible for the plague not to have been transmitted to Korea.

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2) "In an age of SARS, Koreans tout kimchi cure", Los Angeles Times, June 17, 2003(http://articles.latimes.com/2003/jun/17/entertainment/et-magnier17) ; "Kimchi Prevents SARS in Korea", The Seoul Times, November 20, 2014 (http://theseoultimes.com/ST/?url=/ST/db/read.php?idx=74) According to this article, Dr. Hong Chong-hoon of Rural Development Administration in Korea claimed confidently of how kimchi can scientifically prevent SARS". A chemical compound called allicin in garlic is a key to preventing SARS. When allin reacts to allinase, allicin is produced," said Dr. Hong, "Allicin not only gives garlic its characteristic strong odor, but also produces anti-biotic chemicals, which is thought to help to prevent SARS". Dr.Hong provided the scientific ground to the rumor of Korean kimchi. But his theory doesn't explain why allicin works only in SARS, not in others like novel flu.

II. Pandemic diseases in Korea in the early 20th century

1. Cholera

At the end of the 19th century and early 20th century, the diseases which plagued the Korean people the most were small pox and cholera (Sihn, 2009b:319). Ever since it was introduced to Korea in the 7th century, small pox broke out periodically (Lee, 2003) and remained a familiar infectious disease to Koreans. Meanwhile, Cholera, which originated from India in the early 19th century and reached Korea via China to kill some 1 million people in several outbreaks, was also not something new, being known as the 'painful disease which ravaged one's body like a raging tiger.'(Kim, 2014)

1n 1895, after breaking out and killing a patient in a border area city adjacent to Manchuria, cholera rapidly spread nationwide including Seoul within a month. Large outbreaks followed in 1907 and 1909, with 376 infected in 1907, whereas 1,652 patients were afflicted and 1,218 ended up dying in 1909 (Sihn, 2009:364). However, we do not believe all the instances of cholera reported. I suspect that cholera's mortality rate of up to 74% reflects the manifestation of Korean animosity toward the Japanese governmental survey efforts in preparation for colonial rule. During that time Japanese annexation government employed harsh and oppressive measures including mobilizing troops to quarantine the infected area and restricting residents entering or leaving the area. As a result those in the infected areas faced much hardship, not having been able to make preparations or freely leave their homes and thereby suffering shortages of daily necessities such as drinking water. In fact, Pyeongyang, the current capital of North Korea, was placed under martial law by the Japanese military troops stationing there (Park, 2000). Measures such as designating infected households with some kind of identification mark or the cremation of victims

faced serious opposition from the Korean people. Despite all the implementation of regulations and full-scale quarantine, these measures to combat cholera were not effective (Shin, 2009b:361). In this vein of thinking Koreans may well have tried to conceal the outbreak of the plague if possible as tacit resistance to the Japanese authorities, which accordingly could not record all the non-lethal cases, thereby resulting in such a high mortality statistical rate.

The cholera which broke out in Manchuria crossed over the border and spread wildly throughout Korea combined with Japanese authorities' extreme and suppressive measures to force Koreans to suffer from double hardships.

2. Pneumonic Plague

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Country	City	Numbers of cases reported	Total
China	Southeast China	33,207	33,282
	Shanghai	73	
	Peking	2	
Japan	Taiwan Island	35,540	36,640 (1,094 in Japan)
	Osaka	604	
	Kobe	310	
	Yokohama	86	
	Tokyo	58	
	Nagasaki	36	

Table I. Number of cases of bubonic plague reported in China and Japan (from January 1, 1897-December 31, 1922)

During this period the countries with the most reported cases include India and Indo-China [8,864,504], followed by Mauritius [7,732], Brazil [4,770] and South Africa [3,359]. As can be seen almost of all bubonic plague patients were from India and Indo-China. The United States was not spared, with cases reported in San Francisco [279], New Orleans [49] and Seattle [5] (Robertson, 1923:1524).

Taiwan was a Japanese colony at that time, which is why Robertson included the cases from there in the Japanese statistics. In any case, the number of cases from Taiwan is higher than that from China. These statistics appear to be an optical illusion of Taiwan suffering more deaths than China; rather, it seems likely that not all cases were reported from mainland China.

It should be noted that the highest number of cases on the Japanese mainland were reported in Osaka as well as its next door city Kobe. Incidentally, the Osaka region is where many of Korean people migrated to Japan during the colonization period, and many overseas Koreans still reside there.

Since Robertson's case reports excluded those afflicted by pneumonic plague, it is necessary to check the report made by Consul General Fisher on March 7, 1911, entitled Mukden Status of Plague in South Manchuria. He reported 6,523 cases in Harbin [including Russian Hospital cases] and 2,478 in Changchun and others, totaling 26,995 deaths altogether died in South Manchuria. He stated, The above table does not include all the infected districts. Asiho and Hailar, both large places and badly infected, are omitted. Whole villages in the vicinity of Kungehuiing are known to have been wiped out. No account seems to have been taken of a small settlement near Mukden, on the Hun River, to which about 300 of the poorest class were sent from Mukden, 168 of whom are known to have died of plague. Thus he clarified that a large number of cases were omitted from the statistics and reported the devastating situation in South Manchuria to the U.S. Health Department headquarters (Public Health Reports, Apr.21, 1911:575).

While bubonic plague was continuously running rampant on Japan's mainland and its colony Taiwan, how could Korea remain free from the plague? The pneumonic plague that wiped out tens of thousands people in South Manchuria in just a few months' time - how could it skip Korea?

As of now, any research on this subject is taking place ancillary to the Manchurian plague outbreak. This is due to the fact that most research is geared toward analyzing the epidemic diseases which did break out rather than those that did not.

III. Two Contrasting Theories

Regardless of being the bubonic or pneumonic plague, how could Korea remain exempt from the plague? There are currently two theories to explain how Korea, while bordering on Manchuria where Pasteurella bacilli are endemically ever present, could remain free from the plague.

First, from the colonial modernization view, the institution of proper measures against the epidemics carried out by the Japanese authorities was successful in keeping Korea unscathed. According to this line of view, when the plague spread southward after its breakout in October, in November the Japanese authorities in Korea issued the prevention alert code and subjected any traveler from the suspected area to ten days' quarantine. In border cities, quarantine for the plague was in effect, isolating suspicious cases for 3 days. Importing goods from Manchuria was prohibited and for anyone coming into Korea, the city he must pass through had to undertake a census, and carbolic acid was sprayed for preventive measure. Furthermore, the number of military police was increased, and the trains in Pyeongyang were quarantined. All these compulsory measures were supposedly so effective that the annexed land Korea was able to avoid the plague in contrast to Japan itself (Park, 2000).

A critical view on this was recently seen in Shin's study. According to him, the initial measures against the plague were all geared toward the bubonic plague (Sihn, 2009b). Furthermore, in the two months after the first deaths in Manchuria when the death totals were the highest, the Japanese authorities in Korea did not do anything in reality. Moreover, three days' quarantine as opposed to a full 10 days was most likely inadequate enough for effective prevention (Gamsa, 2006 ; Sihn, 2009a) Considering the 800 km-long Yalu River freezes during winter time making it possible to walk across the border, it would be almost impossible to blockade these people (Sihn, 2009a) we are compelled to agree with Shin's critical view denying the measures taken by Japanese authorities as the reason keeping Korea intact from the plague. Moreover, the fact that rat eradication, which has no correlation with pneumonic plague breakout, was undertaken by Japanese authorities as the main drive for preventing the plague strengthens Sihn's view clearly. In fact no Pasteurella bacilli were detected in tens of thousands rats in bacteriological examinations (Sihn, 2009b:376).

Sihn attributed the reason for keeping Korea unscathed entirely was that the 200,000 to 300,000 Chinese seasonal laborers returning back home for the Lunar New Year's Day did not travel through Korea, and the Japanese authorities witnessed unexpected success (Sihn, 2009a). However, can one be sure that the Chinese coolies were the only medium by which the disease was travelling? At that time there were Koreans travelling to Manchuria seeking work, and one cannot ignore the possibility that some of them were returning home. The Korea Diaspora in Manchuria was more than 220,000 in 1910, and was 515,865 in 1922 (Park, 2009:34)[3)]

Therefore there are too many complicated issues and too few resources avail-

3) After Japanese colonization, the number of Koreans was rapidly increasing as well in the Maritime Province of Siberia (Kwon, Hee-young, 2006).

able to resolve this enigma and any answer presented would have to be regarded as a hypothesis similar to that of Park or Sihn.

IV. Two Hypotheses

The abovementioned two theories as to why the plague was not widespread in Korea are only applicable to the outbreaks in the early 20th century. However, Korea was also a relatively plague-free zone in the 13th-14th century as well. Europe's feudalistic society of the Medieval Era came to an end because of the Mongol invasions and also the spread of the plague, which wiped out almost 1/3 of the population. William McNeil studied the impact plagues had on human history from ancient times to modern times. He found that the 13th-14th century plague bacteria first attacked the population in China, then spread throughout the Asian continent, and then reached the Crimean peninsula in 1331 (McNeil, 1975:141-157).

In 1232, the Mongols attacked the Jin capital Kaifeng and had it completely surrounded for 50 days, during which time more than 900,000 people within the city perished. In fact, this 900,000 plus people only refers to those bodies left outside the city which the Mongols allowed to bury. Those who were too poor to be buried were not included in this figure (Deng, 2006:85; Lee, 2007:33-35); as such, the actual number of people who died during the fifty-day siege was probably over one million. What kind of infectious disease could have such a high mortality rate? Someone such as McNeil who considered all infectious diseases with high mortality rates as the 'plague' would have said the cause was the bubonic plague.

While we do not know exactly which epidemic attacked Kaifeng, it is clear that it was a devastating disease which led to the failed defense of the city and the Jurchen's Jin dynasty met its demise. In 1285, the Sichuan province wit-

nessed many rats running into the water and dying; possibly they caught the plague bacteria and scurrying around feverishly (Lee, 2009:35). Using Chinese sources to identify specific diseases that occurred as epidemics in the past is a perilous enterprise indeed (Benedict, 1988:109). However, the death en mass of people was usually after the death of rodent, like the descriptions of Albert Camus in his novel *La Peste*(1947). In view of this, it is highly probable that McNeil's theory that Mongol-ruled China suffered from a plague epidemic.

Korea fought against the Mongols from 1231 to 1254 and was indirectly ruled by the Mongols from 1270 to 1356would the plague have been transmitted to Korea during that time? While the surviving records and literary writings from that time describe many people dying from infectious diseases, there is no evidence that such diseases were the plague. There are Korean records from that period of an outbreak of anthrax transmitted from the Mongols (Lee, 2005:36). It is likely that since the plague was so fatal and usually left the victims darkened after death and so grotesque that such would not have been recorded, and so the truth about an outbreak would not be apparent.

Looking at the map of the second outbreak of pneumonic plague produced by the Malayan-born Chinese medical doctor Wu Lien-teh (1879-1960), who was in charge of combating the 1910 Manchurian pneumonic plague outbreak, one can see that the plague followed the railways and traveled southward (Wu, 1923:281). At the time, the Manchurian railroads were connected to the Korean mainland, and yet even though the pneumonic plague spread to the railroad hub Fengtien, the disease never crossed the border into Korea (see the figure 1).

Could it be that Korea was just lucky in avoiding the plague? There is no reason to look for any other factors. Korea did experience severe infectious diseases borne by rats. Mainly, diseases transmitted through rat feces would cause fevers and hemorrhaging to destroy the body. In fact, the so-called 'Korean Hemorrhagic Fever' as known in the Korean War was a similar hemorrhagic fever with renal syndrome. This is an endemic disease which is manifested yearly.

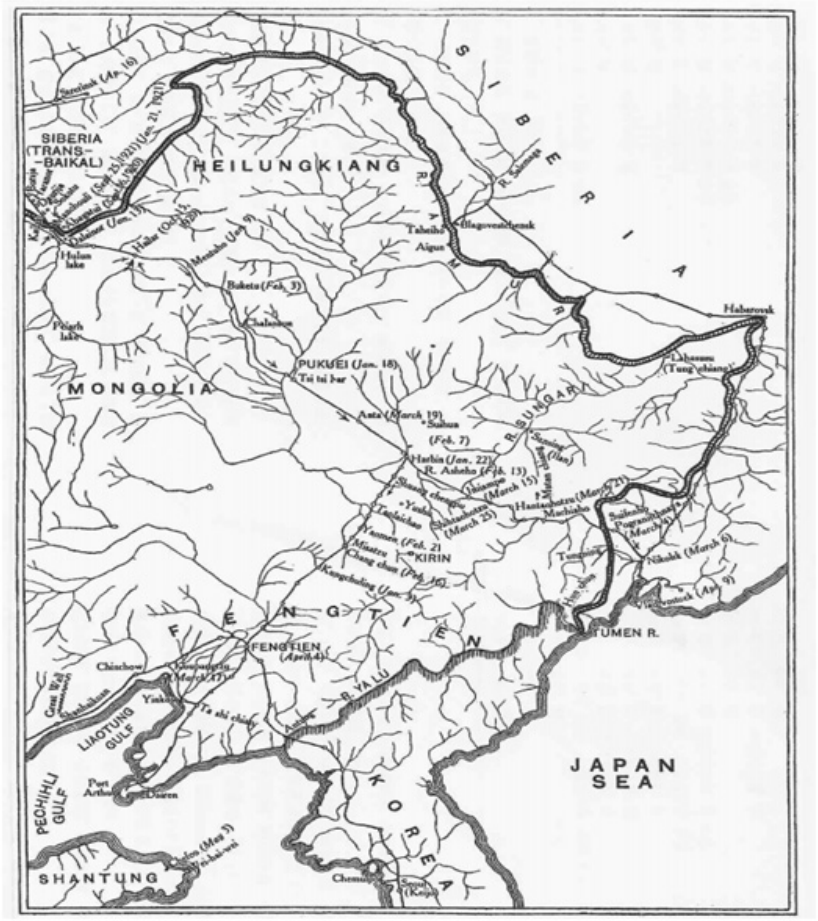

Figure1. Plague Region, Manchuria (from the map of Wu, 1923:281) Dates after names indicate first cases recorded; arrows indicate first invasion of plague, 1920

Yersinia pestis is a type of bacteria which is completely unrelated to the virus which causes Korean Hemorrhagic Fever. Dr. Howang Lee, who discovered the virus causing the disease and developed the vaccine, said that this was most likely a local disease (Lee, 1998:34 ; Lee and Whang, 2004:40)[4]. Could it be that

4) Unlike Dr.Howang Lee, Lee and Whang concluded that the emergence of HFRS would be closely related with the establishment of the munitions supply network in early 1951 in Chinese troops. However, we agree with Dr. Howang Lee, because Lee and Whang's theory is mostly

antibodies for this disease meant that resistance against Yersinia pestis was strong? If the risk factor of the plague bacteria could be ascertained, then the validity of this theory could be validated by scientific experiment.

The second theory relates to the fact that the origins of ancient Korea stemmed from Manchuria. Goguryeo (37 BCE-668 CE), an ancient Korean kingdom, was a dominant presence in the Manchurian region which migrated from Puyeo of northern Manchuria. All of these people were from nomads residing in Manchuria for ages. According to the Korean Myth, from 2,333 BCE Gojoseon (Ancient Joseon) was developed in the Manchurian region (Baek, 2012). In light of this, it seems highly likely that over thousands of years, the predecessors of the Korean people there would develop resistance to the Yersinia pestis bacteria. Furthermore according to the Needham's Report regarding bacteriological warfare in Korean war, Chinese troops pointed out that outbreak of pestilence never occurred in Korea over 500 years (Needham et al, 1952:26). It was well known that Korea used to be a clean country in outbreaking of pestilence for a long time in East Asia.

Sickle-cell disease, which is often cited in biology texts as an example of a genetically mutated disease, is often found in areas where malaria is common and thus mutated in response to malaria antibodies. People with low red blood cell counts have blood where it is hard for malaria antibodies to exist so they are susceptible to malaria. If a person inherits abnormal genetics from both parents, they suffer from diseases such as anemia, severe pain, frequent infections, stunted growth, and peripheral blood vessel necrosis[5] However, if they inherit nor-

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dependent on the fact that the Japanese colonial administration would know if HFRS were a local disease in Korea. When one considers that most of the patients were poor peasants who could not afford very expensive western medicine at the time, their theory seems weak to be convincing.

5) Miller and Levine introduced it as a distinguished case of harmful effects in mutations. According to the report of G. M. Edington in 1959, in West Africa about 30% of the populations were carriers of the haemoglobin S or C traits. The incidence of haemoglobin C was highest in

mal dominant heterozygote from even just one parent, they are able to lead normal lives and are not affected by malaria (Miller and Levine, 2010:374-375).

Is it likely that malaria is the only disease where body develops resistance against a specific disease which can be passed onward to future generations? Our theory is that among the ancient Korean people who lived in Manchuria for thousands of years there were those who developed and passed down resistance to the Yersinia pestis bacteria. The validity of this theory can be tested through DNA analysis and other scientific methods.

V. Conclusion

Until now we have examined the diseases cholera and pneumonic plague which ravaged East Asia in the early 20th century and why Korea was not afflicted by the pneumonic plague. There are two theories as to why that plague did not spread to Korea. The usual explanation is the Japanese colonial authorities were able to establish effective countermeasures and successfully prevent the spread of the plague from Manchuria. However, there is a counter theory that the measures employed at the time were inadequate, and that the plague did not spread to Korea because the Chinese workers carrying the plague avoided Korea on their way home for the Lunar New Year holidays. Both theories fail to fully answer all of our questions. The countermeasures undertaken by the Japanese authorities would not have been able to completely prevent the spread of the plague bacteria. This is evident from the fact that the Japanese mainland

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Northern Ghana and the Haute Volta regions ; it declined towards the east, south, and west. As C declined S rose, so that the combined incidence of the two remained at approximately 30%. The most common types of diseases were sickle-cell anaemia and sickle-cell haemoglobin C disease. G. M. Edington, Sickle-Cell Disease In West Africa, The British Medical Journal, Vol. 2, No. 5151 (1959:570).

itself and the Japanese colony Taiwan suffered from plague outbreaks in spite of similar measures. Also, the fact that there were many Koreans living in Manchuria to avoid Japanese colonial rule would suggest that the theory regarding the movement of Chinese seasonal laborers as being the cause does not hold weight.

While discussing the realities of what diseases did break out and what did not, it would like possible that one could easily focus too narrowly on the short-term circumstances and see only the trees while missing the forest. It is important to study the long-term historic realities of the plague as William McNeil did in studying the history of the plague from ancient times to modern. Doing so reveals that not only did Korea escape from the plague in the early 20th century but it also avoided the bubonic and pneumonic plagues in the 13th and 14th centuries. I have concluded that the Korean people's inherent resistance to hemorrhagic fever and the historical resistance developed by the ancient Korean people residing in Manchuria for thousands of years is related to why the plague did not spread to Korea in the early 20th century. Since these theories are difficult to prove through only historical approaches, scientific experimentation could help shed light on their validity.

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Abstract

Why the Manchurian Plague Did Not Cross the Yallu River in the Early 20th Century

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This paper aims to raise the question and elucidate the reason why the Manchurian plague did not cross the Yallu River, even though smallpox and cholera were prevalent in the early twentieth century during the Japanese annexation period despite supposedly modern preventive measures against epidemics. Considering the well-known rate of infection from this disease, it is noteworthy that Korea, lying adjacent to Manchuria, was virtually exempt from the pneumonic plague. The preventive measures against the plague carried out by the Japanese authorities in their annexed land were often mentioned as evidence of the modernization of the colonized country. But another theory claimed that their preventive measures were not taken properly in reality; rather, some critics regarded the fact that Chinese coolies, the prime source of the plague, did not pass through Korea on their way home for Lunar New Year's Day as the main reason why Korea was exempt from the plague. But these two theories were not enough to explain the enigma. It should be noted that during the fourteenth century, when Mongol troops spread the bubonic plague to China and Europe, there was no record of the plague breaking out in Korea, which was ruled by the Mongols at the time. Manchuria is one of the regions where plague bacilli are ever present, and considering that ancient Korea ruled

over Manchuria for several thousand years, it could be that Koreans developed an inherited immunity against the plague.

Key Words: Pneumonic plague, Manchuria, the early 20th century, Korea, Japanese colonial administration